PEABODY COAL COMPANY

LYNNVILLE MINE

SOUTH MILLERSBURG AREA

ORIGINAL COPPERBELLY CONSERVATION PLAN

CONSERVATION PLAN

FOR

PIGEON CREEK FLOODPLAIN

WARRICK COUNTY

INDIANA

MARCH 23, 1992

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I. EXISTING CONDITIONS WITHIN PIGEON CREEK FLOODPLAIN AND ADJACENT UPLAND SLOPES

A. Historical Land Use

Forest cutting, floodplain draining, creek damming and dredging, farming, grazing, bridge and road construction, and mining have dramatically altered the natural features of the Pigeon Creek floodplain as it courses through the south Millersburg permit area.

Man's disturbance within the Creek channel began with James Anthony's erection of a dam and mill at the present site of Millersburg in 1818. Construction of the Wabash-Erie Canal in 1851 through portions of the original channel was followed by extensive draining by private landowners and channelization by the Warrick County Drainage Board until present time.

Surface coal mining has occurred within the Pigeon Creek floodplain north and west of the permit area since the late 1960's to the present.

B. Topography

The floodplain within the permit area consists of the original creek channel, Wabash-Erie Canal remnants and tow path, and relocated channel of Pigeon Creek and its maintenance access. This corridor is some 1300 feet wide from its eastern edge of Pigeon Creek to the base of the adjoining uplands. This lowland tract has an average elevation of 385 feet above sea level.

Typical of the undulating Wabash Lowlands, the uplands grade westward into the floodplain from 450 to 400 feet above sea level. Characterized by moderate relief, the uplands are relatively flat on top with the western slopes being dissected by ephemeral stream cuts.

C. National Wetlands Classification

The National Wetland Inventory (NWI) map for the Daylight quadrangle shows floodplain acreage below the 390' contour to be classified as a Palustrine system with five classes. They are, palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A); palustrine, unconsolidated bottom, intermittently exposed (PUBG); palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C), palustrine, emergent, scrub-shrub, semi-permanently flooded (P/EM/SS1F); palustrine, emergent, semi-permanently flooded (PEMF); and palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded (PSS1C).

Field reconnaissance has demonstrated that only a portion of the area mapped per the NWI meet the three mandatory performance criteria (plants, soils, and hydrology) for wetland classification.

D. Hydrology

Natural drainage patterns within the corridor have been altered by governmental units, both historic and contemporary, and by private landowner draining. Natural drainage in the old oxbows classified as (PUBG & P/EM/SS1F) have been altered by road construction and ditching resulting in only limited segments of the original channel being semi-permanently flooded.

Pigeon Creek as it flows in its dredged channel may flood the entire floodplain corridor seasonally in response to precipitation events. Rainfall values for the general area are as follows: 10 yr. 24 hr. = 4.7", 25 yr. 24 hr. = 5.3" and 100 yr. 24 hr. = 6.5". Creek flow rates range from a minimum discharge rate of 0.045 million gallons per day (mgd) to a maximum discharge rate of 1,950 mgd. Localized storm events are common to this watershed resulting in periodic flash floods during spring and summer seasons. The corridor drains quickly due to extensive channelization and ditching.

Ground water yields within the general area are classified as being usually less than 10 gallons per minute (gpm). A test well installed in alluvial material on the east bank of Pigeon Creek produced very low yield, less than 1 gpm. During well construction, little material was encountered that would suggest significant water production. Tight clays were predominate resulting in low hydraulic conductivity and transmissivity.

Surface and ground water quality within the floodplain is moderately alkaline, with values for suspended solids, iron, manganese and chloride fluctuating with storm event runoff. All values are within acceptable ranges for warm water fisheries.

E. Soils

Soils within the permit area consist of two silt loams -- the Birds and the Wakeland. Detailed soils mapping was performed by two professional soil classifers to further delineate the Warrick County soils map. Results of their field work revealed the Birds to be a hydric soil and the Wakeland to be a non-hydric soil. Thicknesses of both these soils were found to be 6-12 inches with the overall average thickness of each being 8 inches.

F. Plant Community

As a result of the extensive manipulation of the creek's corridor and adjacent land uses, no relict plant communities are located within the permit area.

The original lowland forest has been replaced with those species associated with transitional bottomlands. Scrub-shrub wetland type vegetation is found in the old oxbows of the original channel of Pigeon Creek and Wabash-Erie canal remnants, while vegetation more commonly associated with bottomland forests is now found interspersed throughout the floodplain.

Monotypic stands of young silver maple and river birch occur between the eastern edge of the existing creek channel and the western edge of the original channel north of Boonville-New Harmony Road. Buttonbush dominates the old oxbows that are semi-permanently flooded. A mixture of various aged hardwoods occur south of Boonville-New Harmony Road.

Sycamore, silver maple, and cottonwood occur in the more frequently flooded portions of the floodplain while the drier areas are dominated by the oaks, elm, and hickory. Rotting logs and woody debris deposited by flood waters and blow-downs are common throughout the floodplain both north and south of Boonville-New Harmony Road.

Plant specie diversity is greater south of the Boonville-New Harmony Road than on the northern portion. Both areas however reflect the influence of disturbance and are evidencing transitional dynamics as a result. The vegetation within the permit area of the Pigeon Creek floodplain is primarily obligate and facultative wetland species.

Facultative species such as giant ragweed and stinging nettle are widely scattered throughout with some individual plants reaching remarkable size, suggesting an already existing presence of invading species. Japanese honeysuckle is found invading the floodplain along its eastern perimeter. Tables I and II list the woody and herbaceous plants inventoried within the floodplain's 100 year flood frequency elevation line (390' contour). No endangered or threatened plant species were found to be existing within the permit area.

Table I. WOODY PLANTS OCCURRING AT OR BELOW 390' CONTOUR

Common Name	Scientific Name	Reg. Category
Silver Maple	Acer saccharinum	FACW
Red Maple	Acer rubrum	FAC
Box elder	Acer negundo	FACW-
Green Ash	Fraxinus lanceolata	(NL)
Cottonwood	Populus deltoide	FAC+
Quaking Aspen	Populus tremuloides	(NL)
Swamp Cottonwood	Populus heterophylla	OBL
Sweet gum	Liquidambar styraciflua	FACW
Sycamore	Plantanus occidentalis	FACW
River Birch	Betula nigra	FACW
American Elm	Ulmus americana	FACW-
Pin Oak	Quercus palustris	FACW
Swamp White Oak	Quercus bicolor	FACW+
Bur Oak	Quercus macrocarpa	FAC-
Shellbark Hickory	Carya laciniosa	FACW
Shagbark Hickory	Carya ovata	FACU
Black Cherry	Prunus serotina	FACU
Persimmon	Diospyros virginiana	FAC
Buttonbush	Cephalanthus occidentalis	OBL
Black Willow	Salix nigra	OBL
Poison Ivy	Rhus radicans	(NL)
Greenbrier	Smilax spp.	FACU
Virginia Creeper	Parthenocissus quinquefolia	FAC-
Wild Grape	Vitis riparia	FACW-
Japanese Honeysuckle	Lonicera japonica	FACU

INDICATOR CATEGORIES

Obligate Wetland (OBL) Occur almost always (estimated probability >99%) under natural conditions in wetlands.

Facultative Wetland (FACW) Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

Facultative (FAC) Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).

Facultative Upland (FACU) Usually occur in non-wetlands (estimated probability 67-99%), but occasionally found in wetlands (estimated 1%-33%).

Not Listed (NL) Not listed in national list of plant species that occur in wetlands: 1988 national summary.

Table II. HERBACEOUS PLANTS OCCURRING AT OR BELOW THE 390' CONTOUR

Common Name	Scientific Name	Reg. Category
Tickseed Sunflower	Bidens aristosa	FACW
Tall Begger Ticks	Bidens vulgata	(NL)
Swamp Milkweed	Asclepias incarnata	OBL
Water Plantain	Alisma spp.	OBL
Soft Rush	Juncus effusus	OBL
Lizard-tail	Sarurus cernuus	OBL
Broadleaf Arrowhead	Sagittaria litifolia	OBL
Arrow arum	Peltandra virginica	OBL
Stinging Nettle	Utica dioica	FAC+
Wood Nettle	Laportea canadensis	FACW
Spotted Jewelweed	Impatiens biflora	(NL)
Clearweed	Pilea pumila	FACW
Swamp Dock	Rumex verticillatus	OBL
Water Parsnip	Sium suave	OBL
Giant Ragweed	Ambrosia trifida	FAC+
Cardinal Flower	Lobelia cardinalis	OBL
Blue Skullcap	Scutellaria lateriflora	OBL
Water Smartweed	Polygonum amphibium	OBL
Moneywort	Lysimachia nummularia	FACW+
Gerardia	Gerardia purpurea	(NL)
Moistbank Pimpernel	Lindernia dubia	OBL
False Nettle	Boehmeric cylindrica	OBL
Spotted Touch Me Not	Impatiens capensis	FACW
Rice Cutgrass	Leersia oryzoides	OBL
Straw-colored Sedge	Cyperus strigosus	FACW
Woolgrass	Scirpus cyperinus	OBL
Ironweed	Vernonia fasiculata	FACW
Duckweed	Lenma spp.	OBL
Reed Canarygrass	Phalaris arundinacea	FACW+
Sedges	Carex spp.	OBL

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G. Wildlife

Wildlife within the permit area of the floodplain is diverse and unique. Most notable is the northern copperbelly water snake (Nerodia erythrogaster neglecta).

The northern copperbelly is a subspecies of the southern redbelly water snake (Nerodia erythrogaster), which is a common and widespread southern species. The northern copperbelly has been observed and collected within several portions of the Pigeon Creek floodplain--north and south of the permit area on both mined and unmined sites.

Wildlife biologist, Mark Sellers identifies the Pigeon Creek floodplain as a significant portion of the snake's now limited national range of distribution. The extent of the northern copperbelly's historic range will probably never be accurately known since it was not correctly identified and accepted as being a subspecies of the southern redbelly until the 1930s. Prior to that time it was incorrectly identified as the northern water snake (Nerodia sipedon).

The northern copperbelly spends much of its time in or near water. Figure 1 depicts its known seasonal activity. The northern copperbelly is primarily an amphibian eater, preferring anurans. Research by Winn and Gillingham on the northern copperbelly in 1987 and corroborated by Seller's 1991 report, suggests that the northern copperbelly uses water as a "thermal regulator and at night as a thermal refugium". Gillingham's 1987 research found that the northern copperbelly's "temperature relations are similar to that of the northern water snake (Nerodia sipedon)".

Observations by Sellers and Gillingham in Michigan and Indiana revealed that northern copperbellies newly emerged from winter hibernacula are "mud-caked and basking at wetland edges". Gillingham's more recent research on the northern water snake at Beaver Island, Michigan, reveals that as a genus, Nerodia water snakes may be using "moist soils immediately adjacent to vernal pools and semi-permanently flooded ponds as winter hibernacula more than originally thought". E. V. Brown in his 1940 doctoral dissertation at Cornell University documented that hibernating northern water snakes were often found in dams of fish hatcheries in borrows close to the water-line.

Documented sitings of this snake on postmining land and waters elsewhere within the Pigeon Creek drainage suggests that the northern copperbelly adapts to disturbed floodplain areas. While the northern copperbelly is usually found associated with dead vegetation around water, it is known to wander farther from water than other water snakes. This trait affords the snake greater opportunity to find mates, locate new food sources, permanent water pools, and hibernacula.

The other significant wildlife feature of the permit area floodplain is the presence of a great blue heron rookery. Located south of Boonville-New Harmony Road along the margins of an old flooded

oxbow, the rookery consists of some 25 nests in old sycamores and cottonwoods. Figure 2 depicts known seasonal activity of the great blue heron in southwestern Indiana.

Trees within the vicinity of the rookery tended to have larger dbh's (diameter at breast heights) and are being utilized by cavity nesting birds such as woodducks, barred owls, red-headed woodpeckers, red-bellied woodpeckers, and prothonotary warblers.

Other birds heard, or observed within the permit area floodplain include: mallard duck, giant Canada goose, wild turkey, belted kingfisher, green heron, great-crested flycatcher, Carolina wren, yellow-bellied cuckoo, eastern wood peewee, and pileated woodpecker.

Mammalian species observed or tracked within the permit area include: white-tailed deer, beaver, raccoon, opossum, mink, muskrat, and squirrel. Beaver lodges, dams, and cuttings are common south of Boonville-New Harmony road. Muskrat lodges and dens were also observed, some of which were located in the dredged channel of Pigeon Creek.

Chimney crayfish burrows, some as high as 6 inches are found throughout the entire floodplain of the permit area.

H. Anticipated Mining and Construction Disturbance

Construction within the floodplain of the permit area will consist of two excavated siltation ponds and a levee along the eastern perimeter of the floodplain. Mining disturbance will be minimized as indicated on the enclosed operations/reclamation map, revised March 17, 1992. There will be no mining disturbance within the oxbows of the original creek channel. Construction activities within 1,000 feet of the great heron rookery will be limited to those associated with the levee and excavated siltation ponds, and major activitity will not occur within 800 feet of the rookery.

II. PROTECTION OF WILDLIFE HABITAT AND PRESERVATION OF WETLAND

The goal of this plan is to protect the unique wildlife habitat associated with the old oxbows and to restore affected upland habitat so that overall habitat diversity and wetland function are preserved. This goal will be accomplished by a series of steps which: 1) accommodate the needs of the targeted wildlife species to be protected; the northern copperbelly water snake and the great blue heron, and 2) promote plant community diversity. Mining and reclamation techniques will be utilized which facilitate restoration of a landscape that provides for the moisture, and nutrient needs of wetland and upland plant communities. Several federal, state, and university biologists were consulted in the formulation of this plan. Levee and sediment pond sites were located as directed by USFW and Indiana Divisions of Nature Preserves, Wildlife, and Reclamation so as to minimize habitat disruption.

A. Mining and Reclamation Techniques and Timing

The mining plan on the uplands has been designated to minimize the amount of disturbance occurring at any one time. Cast overburden handling will be accomplished so that the overall watershed topography will be preserved. The approximate original contour will be returned on the uplands resulting in a gently rolling terrain gradually sloping into the floodplain. Post-mining elevations will be monitored by registered engineers and surveyors at the mine so that the overall topographic features are similar to pre-mining conditions. Elevations within the forested floodplain are expected to remain essentially the same due to limited disturbance occurring below the 390′ contour which is the 100 year flood frequency line. Variances in post-mining elevations will occur at the construction sites for the sediment ponds, and levee which have been designed and are to be left as habitat compensation sites for the northern copperbelly water snake. Peabody will strive for topographic diversity as a compensation measure.

An undisturbed upland slope comprising approximately 4.5 acres between the 390′ and 410′ contours will be left at the northeast end adjacent to the first sediment pond to serve as winter hibernacula for the northern copperbelly water snake and to serve as a native seed source for hardwood tree species.

Levee and sediment pond siting has been done to avoid the old oxbows. Any outlet ditches used to convey sediment pond discharges to floodplain oxbows will be constructed so as to minimize disturbance. Tree cutting and removal at these sites will be done at times which will minimize their effects on the migration of the northern copperbelly water snake and the courting, mating, and nesting of the great blue heron. Construction of sediment ponds and levee in the vicinity of the rookery south of Boonville-New Harmony Road will be done during seasonal periods that will avoid the courtship, mating, and

incubation periods of the great blue heron. A professional biologist will be conducting weekly field observations during the spring season from viewing points 1000 feet from the rookery to determine when the rookery is being utilized. This field monitoring will allow for adjustments in the construction schedules based upon the birds' actual use of the rookery which may be affected by factors such as weather or predation.

The actual area of disturbance during levee and diversion ditch construction (which will be done in phases) will be kept to a minimum. An undisturbed tree line should serve as an effective visual barrier between construction and mining sites and the rookery.

B. Enhancing Hydrologic Features of Uplands and Floodplain

Water handling during mining will allow runoff to be collected and passed through siltation basins to reduce sediment loads. Discharge from these structures will be directed to enter the old original creek channel providing supplemental flows during dry periods.

The levee will be breached in several places, particularly north of Millersburgh where it is the longest. Excavated pond volume will not be reduced by breaching the levee.

Cast overburden is characteristically more porous than undisturbed strata and is more capable of storing and releasing larger volumes of ground water. The reconstructed upland will provide greater temporary storage during high precipitation events, thus reducing peak storm flows, and ultimately contribute a longer period of base flow during the late summer season. Cast overburden handling and grading will be done to promote water retention on top of the uplands by creating shallow depressions and ponds which will serve as recharge sites. Groundwater conditions after mining will be compatible with hardwood reforestation on the upland slopes as well as providing base flows sufficient to facilitate ecological succession in emergent wetlands.

C. Soils Management

Soil replacement on the lower upland slopes will be done so that compaction is minimized. Soil compaction in the post-mining forested sites will be minimized by use of tracked equipment during grading and avoiding double handling of topsoil by rubber-tired equipment when possible. An attempt will be made to handle topsoil to avoid conditions which may contribute to soil compaction problems.

Soils of a similar texture class will be replaced at eight to twelve inch depths to facilitate reestablishment of necessary biological and chemical process. Contemporaneous reclamation will be done so that the areal extent of unvegetative topsoil will be minimized. Slopes along the floodplain and/or other erosion prone slopes will be

mulched or temporarily seeded with small grains and grass/legumes as required by the Division of Reclamation regulations to reduce erosion and provide forage for wildlife. Riprap will be placed as needed along reestablished drainage ways to reduce erosion.

D. Revegetation

Hardwood tree species which will be planted in the restored palustrine habitat will be similar to those that existed prior to mining. Natural recolonization of rapid invading species such as silver maple, eastern cottonwood, black willow, and river birch usually occur throughout disturbed moist soil sites. In order to avoid monotypic stands of the previously mentioned species, planting of swamp white oak, bur oak, sycamore, sweetgum and swamp chestnut oak will be done. Actual species composition will depend upon what is available from state nursery stock during the planting season and will be representative of those specie found in floodplain habitat. Placement of individual species will be done according to topographic conditions after grading so that each species is placed in its most favorable microhabit to maximize its chance for survival. Plantings will also be spaced to allow increased mast production. Previous experience with upland and floodplain restoration on other Peabody Midwest properties have shown that restoration of wetland plant communities have occurred rather quickly when designed or allowed to occur naturally.

Reclaimed slopes above the floodplain will be planted with hardwood tree species appropriate for wildlife use. These species include those mentioned earlier plus those hardwood species requiring drier soil conditions such as white oak, red oak, and black oak. Plantings will be made by 8′ by 8′ spacings yielding a seedling population of approximately 680 trees per acre. Use of exotic, invasive species will be avoided.

Shrub plantings will be done along drainage ways and at pond and levee sites to maximize available edge and interspersion. These species will included dogwood, buttonbush, hawthorn, and alder when they are available from the state nursery. Native specie will be used to the extent practicable. Plantings rates will vary somewhat but will typically be done by 6′ by 6′ spacings depending on specie availability from state nurseries during the planting season. Black alder and stiff dogwood will be used when available.

Temporary cover for pond, levee, topsoiling sites within the floodplain and adjoining lower upland slopes will consist of annual grasses such as wheat, oats, rye, sorghum, and millet, depending upon soil moisture conditions. Plantings of native grasses and forbs will depend upon availability of seed, cost, and erosion control factors. When utilized, planting of native perennials will be limited to sediment pond and levee sites. Ultimately natural recolonization by floodplain native perennials may be expected to occur with the use of annual grasses on disturbed sites.

Temporary cover plantings on forested upland and floodplain areas will be subject to compliance with erosion control regulations of the Division of Reclamation and periodic adjustments to species composition may have to be made. Fescue will not be planted if at all possible.

E. Protecting Wildlife Resources

Construction of the levee and sediment ponds will be done in progressive stages to minimize impacts on the snake. Construction will avoid peak activity periods of mid-April to late May when the snake is foraging and mating around wooded edges of swamps and lakes. Adjustments to the construction schedule will be made as appropriate based upon field observations made by a professional biologist per the monitoring plan discussed later in this document. Immediately prior to initiation of construction, on-site inspections of each site will be conducted under the supervision of a professional biologist to reduce the likelihood of incidental take of the snake during earth moving.

Locations of any snakes discovered during this search will be documented on a 1" = 400' base map and photographed. If appropriate, any snakes discovered in the path the earthmoving equipment will be caught and immediately relocated down in the floodplain away from the construction site.

Brush clearing and topsoil removal on lower slopes adjoining the floodplain will be done after the snake has left its winter slope hibernacula, generally after mid-April. Adjustments to brush clearing and topsoil removal schedules will be made as appropriate based upon on-site observations by a professional biologist. Prior to initiation of brush-clearing and topsoil removal on the adjoining lower upland slopes, on-site inspection will be made during the first week to further reduce the likelihood of incidental take of late emerging snakes. Locations of any snakes discovered during this search will be documented on a 1' = 400' scale base map and photographed. If appropriate, any snakes discovered in the path of earthmoving equipment will be caught and immediately relocated down in the floodplain away from the topsoil removal site. As more experience is gained from actual on-site seasonal activity of the snake after the first year of monitoring, searches may not be necessary prior to implementation of brush clearing and/or topsoil handling in successive years.

Trees and brush will be placed intermittently along the margins of constructed sediment ponds, graded cast overburden edges, and along the levee to provide winter hibernacula, basking, and estivation sites for the northern copperbelly water snake. General locations of trees and brush are shown on the enclosed map. When needed, trees and brush will be anchored to prevent migration within the floodway. Riprap will be used to provide migration corridors for the northern copperbelly water snake.

Pond and levee embankments will be promptly mulched and seeded (e.g. with grasses such as smooth brome and switchgrass) to promote

recolonization by native seed sources from the floodplain. Pond water will be discharged to the original creek channel providing supplemental water during dry periods so that more of the old oxbows which now go dry in late summer will retain some water.

Shrubs and trees will be planted next to the ponds as appropriate and available from state nursery stocks. Specie selection will be based upon those indigenous specie already present in the floodplain.

A visual barrier consisting of uncut trees will remain between the construction sites and the heron rookery so as to not disturb nesting herons. Construction of sediment ponds and levee in the vicinity of the rookery south of Boonville-New Harmony Road will be done during seasonal periods that will avoid courtship, mating, and nesting periods of the great blue heron. A professional biologist will be conducting weekly field observations during the spring season from viewing points 1000 feet from the rookery to determine when the rookery is being utilized. This field monitoring will allow for adjustments in the construction schedules based upon the birds' actual use of the rookery which may be affected by factors such as weather, or predation.

Nesting structures for woodducks, mallards, and owls will be placed as appropriate throughout the permit floodplain corridor. Artificial winter hibernacula for the northern copperbelly will be placed adjacent to moist soil sites on disturbed upland slopes.

Plant community diversity on post-mining disturbed sites is expected to be favorable for wildlife due to preservation of spatial heterogeneity of landforms along the 390' contour interval. Overall hydrologic functions can be expected to facilitate the return of floodplain conditions prior to channelization and dredging of Pigeon Creek. Flood control concerns will be met by the reduction of peak flows originating from the uplands.

F. Increasing Public Awareness of Wetland Values

General public access to the area will be restricted to reduce wildlife harassment, poaching and trash dumping. Local residents of the area historically have viewed the Pigeon Creek floodplain as a worthless swamp. As a result it has been used as a trash dump by area residents. Community involvement may be encouraged via soliciting volunteers to help construct nest boxes, etc. Peabody may request state and federal wildlife agencies to provide public education information concerning the value and worth of this unique habitat.

G. Long-Term Dedicated Wildlife Land Use

Finally, Peabody will commit to the dedicated wildlife use of our property within this corridor by means of a conservation easement (refer to enclosed easement document and map).

H. Peabody's Wildlife Commitment

Peabody has consistently found that wildlife needs can be successfully incorporated into post-mining land uses when those needs are an integral part of the operations and reclamation plan. Peabody is committed to continuing that policy. Several wildlife species once considered to be extirpated from the Indiana landscape were reintroduced on Peabody post-mined lands in Warrick County. Those species include the white-tailed deer, wild turkey, beaver, and giant Canada Goose. Similarly, several contemporary endangered or threatened species are now regularly observed utilizing Peabody post-mined lands are resident or as migratory species. They include: northern harrier, short-eared owl, osprey, sand-hill crane, American bittern, sharp-shinned hawk, red-shouldered hawk, broad-winged hawk, Virginia rail, common loon, double-crested cormorant, and trumpeter swan.

I. Northern Copperbelly Water Snake Monitoring Plan

The purpose of this monitoring plan is to obtain field data which will facilitate habitat restoration favorable for the northern copperbelly and to provide guidance in implementing construction schedules that will minimize impacts on the snake especially during its winter hibernation and mating periods.

Monitoring will be conducted by professional biologists one of which will be an expert in wetlands and herpetology with field experience in reconstructed wetland habitats associated with surface coal mined lands.

Field information for this monitoring plan will be gathered before, during, and after mining to determine effectiveness of habitat compensation measures and reclamation techniques recommended by federal and state wildlife personnel and to determine the status of the northern copperbelly population within the permit area. A monitoring grid system will be developed specifically for this project to help standardize search procedures. All field data will be recorded on standardized forms designed specifically for this monitoring effort. Base maps of 1" = 400' will be utilized for plotting field information. Photographic records will consist of 35mm slides and prints. All documentation will be considered the property of Peabody Coal Company and will be copy right protected. Monitoring reports will be prepared biannually until permanent vegetative cover has been established with a final summary report being prepared five years after permanent vegetative cover has been established.

Monitoring before mining will concentrate on determining the locations of winter hibernacula on slopes adjacent to the floodplain in order to more precisely define the spatial relationships of winter hibernacula to water bodies and specific elevations. Two detailed searches will be conducted on a grid system developed specifically for this monitoring effort using survey reference points. The first will

begin during late March or early April when the snakes are most likely to be emerging from their winter hibernacula and basking near den entrances. The second search will be in May when peak activity occurs. Ambient air temperatures, soil temperatures, and water temperatures will be recorded on days of each search along with notations of general weather conditions and storm events. Winter hibernacula sites discovered during the searches will be mapped on a 1" = 400' scale map and photographed. Field notes concerning the features of each site will also be made. During the May search a population census will be taken along with notation of mating sites and possible sexing of some individuals collected and released. Marking of some individuals will be considered but may or may not be actually done.

Monitoring during construction disturbance and mining will be done prior to earth moving within new quadrants of the search grid developed during the pre-mining disturbance phase. The frequency of monitoring will be dependent upon findings obtained during pre-mining searches. In order to prevent incidental take of individuals emerging later than expected (females are known to emerge later than males), or isolated individuals wandering onto the path of earthmoving equipment, opportunistic searches by an on-site biologist will be conducted. Any copperbelly snakes discovered will be relocated down slope of the disturbed area. Locations of such individuals will be plotted on the base map and photographed. Opportunistic searches will also be conducted on adjoining undisturbed slope and floodplain sites to determine movement of individuals away from the earthmoving equipment . Monitoring periods and frequency will be adjusted according to first year findings. As more experience is gained from actual on-site and off-site movements of the snake in response to ground disturbance, searches and observation periods may be changed or dropped entirely after June 1 of each year. Monitoring of brush piles and rock piles placed intermittently along disturbed edges of topsoil removal areas, along levee and sediment pond berms, pond outfalls, and along drainage ways will be repeatedly checked for snake use. Each successive year's monitoring effort may be adjusted pending findings from the previous year and the current year's weather conditions.

Monitoring during and following reclamation will focus on copperbelly utilization of reconstructed habitat and use of artificial hibernacula both temporary and permanent. The grid system developed during the pre-mining monitoring phase will be utilized for detailed searches in early spring and summer by search team members. Opportunistic searches will be conducted on reaffected areas in order to prevent incidental take of recolonizing snakes. After permanent vegetation has been established within the entire monitoring grid, searches will be done annually in the spring for a period of five years. During the fifth year a comprehensive search will be conducted on the reclaimed lands and waters and within the adjacent undisturbed floodplain and slopes to determine the population status of the northern copperbelly. Subsequently, a summary report will be prepared discussing the findings of the monitoring effort.

J. Employee Education Program

Peabody employees have historically been very supportive of wildlife projects on the mines. Wetland brochures from USFW and IFW are requested for distribution to mine employees which will be added to an employee packet developed for this permit. Mine supervisory personnel and employees operating pan, dozers, and reclamation equipment will be informed of the identification and any legal protection of northern copperbellies.

K. Summary

This document details a reclamation and conservation plan which has been developed specifically with regard to natural characteristics of the Lynnville South Millersburg permit area. Significant effort and resources have been expended for research, site assessments and field reconnaissance, plan design and implementation scheduling. In addition to costs associated with the development of this plan, substantial expenditures for construction work and materials will be required for implementation during and subsequent to mining.

It should be emphasized, that despite the loss of revenue from recoverable coal which will not be mined so as to maximize protection of unique habitat delineated by agencies such as the USFW and IFW, Peabody Coal Company has committed large sums of money towards the development and implementation of this plan. Also, Peabody's past and ongoing record of successful habitat and wildlife restoration programs is recognized throughout the coal mining industry.

Peabody Coal Company takes this opportunity to recognize the efforts of those professionals contacted and consulted during the development of the plan. Large volumes of both published and unpublished scientific and professional publications were reviewed as well as many hours of personal contact made with experts knowledgeable in wetland restoration, agronomy, biology, ecology, herpetology, hydrology, revegetation and reforestation, construction methodologies, etc. Attached, and cited as REFERENCES, is a partial listing of published and unpublished material reviewed during development of this plan.

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